

## TITLE OF THE INVENTION

INFORMATION PROCESSING APPARATUS, SYSTEM AND METHOD

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## FIELD OF THE INVENTION

10 This invention relates to an information processing apparatus, method and system for transmitting document information within a document management system by electronic mail.

## BACKGROUND OF THE INVENTION

15 In general, when document information in a document management system is transmitted by an electronic mail application, the document information itself or the result of expanding the document into an image having a certain format is transmitted.

20 However, if the amount of data of the document perse that is to be transmitted is large, a great load is placed upon the electronic mail system. Regarding an image document stored in the document management system, it is possible to add additional information such as annotation information and user's own property  
25 information to expanded data. However, when an actual document is attached to an electronic mail, it is not

easy to display an actual document and its additional information with explicit indication of the relationship between them. If the actual document can be referred in the format or state in which it was stored in the

5 document management system, the above problem will be solved. However, in order to perform the above operation, it is necessary to ascertain the storage location of the document through a different method and the procedure involved is troublesome.

10           Furthermore, in a case where the document is  
referred to in the format in which it was stored in the  
document management system, there are instances where  
user registration is necessary in order to access the  
system in which the document exists. The result is poor  
15 operability.

## SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to make it possible to transmit specific information such as the storage location of a document (object) and access privilege without transmitting the actual substance of the object or a file in which the content of the object has been converted to an image, thereby making it possible to display the document easily on the receiving side without increasing the load upon the

electronic mail system.

Another object of the present invention is to make it possible to transmit the storage location of a document as the main body of electronic mail so that the document can be displayed easily on the receiving side.

Another object of the present invention is to make it possible for a receiving party to gain temporary access to a document without requiring that the receiving party register as a user with the system in which the document has been stored.

A further object of the present invention is to make it possible for the transmitting side to limit the version of documents accessed by a receiving party, whereby diverse access control can be realized with facility.

A further object of the present invention is to make it possible for a receiving party to access a document within a folder the same as that containing a document specified by the transmitting party, whereby diverse access control can be realized with facility.

According to the present invention, the foregoing objects are attained by providing an information processing apparatus capable of transmitting electronic mail, comprising: designating means for designating a desired object to be attached to electronic mail; acquisition means for acquiring access information

relating to the object designated by the designating means; and generating means for generating electronic mail information which includes the access information acquired by the acquisition means.

5           According to another aspect of the present invention, the foregoing objects are attained by providing an information processing apparatus capable of receiving electronic mail, comprising: extraction means for extracting access information contained in  
10   electronic mail that has been received; access means for accessing an object based upon the access information extracted by the extraction means; and display means for presenting a display that corresponds to the object based upon content of the object accessed by the access  
15   means.

          According to the present invention, the foregoing objects are attained by providing an information processing system in which electronic mail can be transmitted and received between information processing  
20   apparatus, comprising: generating means for generating electronic mail which includes access information relating to an object to be attached to electronic mail; communication means for sending and receiving the electronic mail generated by the generating means; and  
25   access means for accessing the object based upon the access information contained in the electronic mail

received via the communication means.

Other features and advantages of the present invention will be apparent from the following description taken in conjunction with the accompanying drawings, in which like reference characters designate the same or similar parts throughout the figures thereof.

#### BRIEF DESCRIPTION OF THE DRAWINGS

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The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

Fig. 1 is a system block diagram illustrating the configuration of an information processing system to which there is applied a scheme for giving notification of document storage information according to an embodiment of the present invention;

Fig. 2 is a block diagram showing the details of construction of a PC and database server in the information processing system which applies the scheme for giving notification of document storage information according to this embodiment;

Fig. 3 is a diagram showing an overview of a main



A preferred embodiment of the present invention will now be described in detail in accordance with the accompanying drawings.

Fig. 1 is a system block diagram illustrating the configuration of an information processing system to which there is applied a scheme for giving notification of document storage information according to an embodiment of the present invention. The information processing system comprises at least two computers (PC-A 201 and PC-B 202), a database server 203 and an electronic mail server 204. The computers 201 and 202, which function as mail clients, can be ordinary personal computers or workstations. In this embodiment the database server 203 stores documents and the like to be transmitted by electronic mail. The electronic mail server 204 stores and distributes electronic mail that has been transmitted in the system. The computers 201, 202, database server 203 and main server 204 are connected by a network 205.

Fig. 2 is a block diagram showing the details of construction of a personal computer and database server in the information processing system which applies the scheme for giving notification of document storage information according to this embodiment. As shown in Fig. 2, a personal computer (PC) 300 corresponds to the personal computer 201 or 202 in Fig. 1. The PC 300

includes a display unit 301, an input unit 302, a central processing unit 303, an external storage device 304, a memory 305 and a network interface 306. A database server 310 corresponds to the database server 5 203 in Fig. 1 and includes a network interface 311, a central processing unit 312, a memory 313 and an external storage device 314. The network interfaces 306 and 311 are connected by a network cable.

The display unit 301 in the PC 300 has a CRT or LCD 10 and presents various displays under the control of the central processing unit 303. The input unit 302 includes a keyboard and a pointing device, for example, and is for making various inputs to the central processing unit 303. The central processing unit 303 15 implements various processing, described later, by executing a control program that has been stored in the memory 305. The external storage device 304 is a large-capacity non-volatile memory typified by a hard disk or the like. The memory 305, which is constituted by a RAM 20 or the like, provides a working area for the central processing unit 303. The network interface 306 is for making a connection to the Internet by a modem, etc., via a telephone line.

The network interface 311 in the database server 25 310 is for making a connection to the Internet, by way of example. The central processing unit 312 implements



various processing, described later, by executing a control program that has been stored in the memory 313. The external storage device 314 is a large-capacity non-volatile memory typified by a hard disk or the like.

5        Fig. 3 is a diagram showing an overview of a main window for displaying an at-a-glance view of objects in a document management system or image management system which applies a scheme for giving notification of document storage information according to this  
10        embodiment.

         Fig. 3 shows a main window 400. In Fig. 3, objects in a storage area  $\alpha$  are displayed in a thumbnail format. In this example, there are two objects, namely A and B. It should be noted that the storage area  $\alpha$  corresponds  
15        to, e.g., a directory or folder. Buttons 401 are for selecting whether the format of the display presented in an at-a-glance display area 403 is the thumbnail format or a list format. Buttons 402 are for changing the storage area to be displayed in the at-a-glance view.  
20        The at-a-glance display area 403 displays objects. More specifically, this is an area in which objects in the storage area selected by the buttons 402 are displayed in an at-a-glance view in a format (thumbnail or list) selected by the buttons 401. Fig. 3 illustrates a state  
25        in which a thumbnail display has been selected. An icon 404 corresponds to an electronic mail application. An

object displayed as a thumbnail image or an icon  
displayed in a list in the at-a-glance display area 403  
may be dragged and dropped on the icon 404 of the  
electronic mail application, thereby making it possible  
5 to transmit electronic mail to which information  
relating to this object has been attached.

It should be noted that an object that has been  
dragged and dropped on the icon 404 of the electronic  
mail application has version information. In a case  
10 where the transmitting party has not allowed the  
receiving side to access all versions, only an object  
having the version information can be accessed. This  
will become clear from a description rendered later.

Fig. 4 is a diagram illustrating an access-key  
15 configuration screen 500 displayed when one object  
displayed in at-a-glance form in Fig. 3 has been dropped  
on the icon 404 of the electronic mail application.  
This screen enables the setting of information necessary  
to access the object and to store the information as an  
20 access key. The object shall be referred to as a  
document below. Moreover, in this specification, it  
will be assumed that the document includes a text file,  
an image file, etc.

The access-key configuration screen 500 shown in  
25 Fig. 4 includes a user name 501 that makes it possible  
to access this system (e.g., a database server in which



with regard to all documents.

Area 504: Sets whether or not a period of validity is to be set for the access key that has been created.

Area 505: Sets the period of validity.

5 If an OK button 506 is pressed (clicked) after the above-mentioned items have been set, an access-key file is created using the configured content being displayed on the access-key configuration screen 500 and the file is attached to an electronic mail file. If a cancel  
10 button 507 is clicked, then processing is suspended without the creation of access-key file.

Fig. 5 is a diagram illustrating an access-key format 510 prior to encryption of an access-key file generated based upon content configured by the access-  
15 key configuration screen shown in Fig. 4. Numeral 510 in Fig. 5 denotes the access-key format prior to encryption. Since the access key usually is encrypted, it cannot be referred to or edited directly by a text editor.

20 In Fig. 5, "ABSOLUTE STORAGE LOCATION OF DOCUMENT" is where the absolute storage location of a dropped document in the database system is set. "USER NAME" is either "ACCESS-KEY USER" or "NONE" entered in the area of user name 501. "PASSWORD" is where a password  
25 established by the database system is set only in a case where an access-key user has been set. "ACCESS

PRIVILEGE" is set only in a case where "ACCESS-KEY USER" has been set: In this example, either "READ/WRITE" or "READ" is set. "APPLICABLE-DOCUMENT ALL-VERSION ACCESS ENABLE FLAG" is where a value (enable/disable) specified using the check box area 508 in Fig. 4 is set. "SAME-FOLDER ALL-DOCUMENT DISPLAY FLAG" is where a value (on/off) specified using the check box area 503 of Fig. 4 is set. "KEY-FILE VALIDITY DATE" is where the period of validity set in area 505 in Fig. 4 is saved only in a case where the check box area 504 of Fig. 4 is checked. "ID OF APPLICABLE DOCUMENT" is where the ID of the selected document is set in a form that includes the version number. If "SAME-FOLDER ALL-DOCUMENT DISPLAY FLAG" is ON, the IDs of all documents present in the same folder are added on in a form that includes the version numbers.

Figs. 6A, 6B and 6C are diagrams useful in describing examples of screen displays, as well as the operation thereof, in a case where a received access key is used in the scheme for giving notification of document storage information according to this embodiment.

Fig. 6A shows a main window in which an at-a-glance view of documents in a storage area Z is displayed in thumbnail form. Here one document (C) is being displayed in an at-a-glance display area 601.

Fig. 6B illustrates the window of an electronic mail application. A main window 610 of the electronic mail application indicates an overview of a main window displayed by the electronic mail application. As in the manner of a window of an ordinary electronic mail application, the window 610 is divided into a mail header area 611 which displays a mail header, a mail body area 612 which displays the body of mail, and an attachment data area 613 which indicates attachment data. An icon 614 corresponds to an access-key file generated through the above-described procedure and attached to this electronic mail.

If the icon 614 corresponding to the access-key file that has been attached to the received mail is dragged and dropped on the thumbnail image display area 601, the database is accessed based upon the information that has been saved in this access-key file. It is assumed here that the access-key file of icon 614 has been generated on the side of the transmitting party of this electronic mail by dropping document A in storage area  $\alpha$  of the personal computer on the transmitting side onto the icon 404 of the electronic mail application in the manner shown in Fig. 3. In this case the window display of the personal computer on the receiving side changes from the content shown in Fig. 6A to the content shown in Fig. 6C. Here, it is assumed that documents A



user of the personal computer 202, that the electronic mail in such case is accumulated in the electronic mail server 204 and that the electronic mail server 204 notifies the personal computer 202 of the fact the  
5 electronic mail arrived. Alternatively, it will be assumed that the electronic mail is sent from the electronic mail server 204 to the user of the personal computer 202

First, at step S101 in Fig. 7, the absolute storage  
10 location of a document (document A in storage area  $\alpha$  in this example) specified by the operation illustrated in Fig. 3 is acquired through the central processing unit 312 of the database server 310 via the network interfaces 306 and 311. Next, at step S102, the  
15 privilege to access this document is acquired at step S102 in a manner similar to that of step S101. Then, at step S103, the privilege to access the folder containing this document is acquired through a similar procedure.

This is followed by step S104, at which the access-  
20 key configuration screen 500 is displayed to allow the user to enter the conditions for creation of the access key. It should be noted that the access privilege 502 is restricted so as not to be less stringent than the conditions acquired at step S102. For example, if the  
25 document access privilege acquired at step S102 is only "READ", then "READ/WRITE" in access privilege area 502



is dimmed beforehand to make the selection thereof impossible. Similarly, if the folder access privilege acquired at step S103 is "DISPLAY APPLICABLE DOCUMENT ONLY", then the check box of area 503 is dimmed

5    beforehand to make selection thereof impossible.

Next, at step S104a, the ID of the selected document is acquired in a format that includes the version. Furthermore, if the "SAME-FOLDER ALL-DOCUMENT DISPLAY FLAG" is ON, then the IDs of all documents present in the same folder are acquired in a format that includes the versions.

This is followed by step S105, at which it is determined whether "ACCESS-KEY USER" has been specified as the user name in area 501 of Fig. 4. If the decision is "NO", then control proceeds to step S107. If, on the other hand, it is found at step S105 that "ACCESS-KEY USER" has been specified as the user name, control proceeds to step S106. Here the password of "ACCESS-KEY USER" is acquired through the central processing unit 312 of database server 310.

An access-key file of the kind shown in Fig. 5 is created at step S107 based upon the information obtained above and the file is subjected to compression processing. The compressed access-key file is attached to the electronic mail application at step S108 and the electronic mail is transmitted at step S109. It should

be noted that the operation at step S109 may be executed on the side of the electronic mail application.

Thus, an access-key file corresponding to a desired document is transmitted by electronic mail.

5 Described next with reference to Figs. 8A and 8B will be document display processing executed by the central processing unit 303 of this system in a case where the icon 614 corresponding to the access-key file has been dropped on the at-a-glance display area 601  
10 from the attachment data area 613 of the electronic mail application at the apparatus on the side that receives the electronic mail. Figs. 8A and 8B are flowcharts illustrating document display processing based upon the access key. In this example, the processing described  
15 is that executed when electronic mail that has been attached by the user of the personal computer 201 is stored in the electronic mail server 204, the electronic mail server 204 notifies the user of the personal computer 202 that there is incoming electronic mail, the  
20 user of the personal computer 202 opens this electronic mail and displays the document in accordance with the access key.

The compressed access-key file corresponding to the icon 614 is uncompressed, the access content (access  
25 information) that has been saved in this file is acquired and the content is stored in memory 305 at step

S701. This is followed by step S702, at which it is determined whether the date of operation falls within the period indicated by "KEY-FILE VALIDITY DATE" in the access content. If the date of operation falls outside  
5 this period, and error message is displayed at step S710 and processing is terminated. If it is determined at step S702 that the date of operation falls within the period of validity, then it is determined at step S703 whether the user name is contained in the access  
10 content. If the access content does not have the user name (in case of "NONE" for user name), this means that the document can be referred to only by a registered user. At step S704, therefore, a display for entering the user name and password is displayed to allow the  
15 user to set the same.

This is followed by step S705, at which log-in to the database is performed based upon the content that has been saved in the access key and the content that has been entered at step S704. In a case where the user  
20 name 501 has been set, log-in to the database is performed based upon the user name and password contained in the access-key format 510 (Fig. 5). Next, it is determined at step S706 whether log-in succeeded. If log-in failed, an error message is displayed at step  
25 S710 and processing is terminated. If it is determined at step S706 that log-in succeeded, the specified

document is read in at step S707 in accordance with the  
access content. It is then determined at step S708  
whether read-in succeeded. If it is determined that  
read-in failed, control proceeds to step S709a. In this  
5 case, an applicable document does not exist and  
therefore a display is presented to the effect that the  
document cannot be accessed. Control thenceforth  
proceeds to step S711 so that processing relating to  
display of other documents in this folder may be  
10 executed.

If it is determined at step S708 that read-in  
succeeded, then control proceeds to step S708a, at which  
it is determined whether the all-version flag is ON or  
not. If the all-version flag is ON, i.e., if a version  
15 check will not be carried out, control proceeds directly  
to step S709. On the other hand, if the all-version  
flag is OFF, i.e., if a version check will be carried  
out, control proceeds to step S708b. Here it is  
determined whether the version information of the ID  
20 that has been stored in the access key matches the  
version information of the applicable document. If it  
is determined that a match has been achieved, control  
proceeds to step S709. Here a display relating to the  
applicable document is presented and control proceeds to  
25 step S711. In regard to step S709, if the method of  
presenting the display in the main window is in



been set, then the next document in the same folder is read in at step S712 while taking into consideration also the document ID value at the same storage location as that of the applicable document in the access key.

- 5 It is determined at step S713 whether read-in succeeded and, if failure is the decision, then control proceeds to step S714a. This means that the document has been deleted. If the decision rendered at step S713 is that read-in succeeded, then it is determined at step S713a
- 10 whether the all-version flag is ON or not. If the all-version flag is ON, i.e., if a version check will not be carried out, control proceeds directly to step S714. On the other hand, if the all-version flag is found to be OFF at step S713a, i.e., if a version check will be
- 15 carried out, control proceeds to step S713b. Here it is determined whether the version information of the ID that has been stored in the access key matches. Control proceeds to step S714a if a match is not achieved.

- The document is displayed at step S714 in
- 20 accordance with the display format. In order to indicate at step S714a that the applicable document could not be accessed, the thumbnail image is displayed in black in the thumbnail mode and an indication to the effect that the document is inaccessible is displayed in
- 25 the case of the list display. This is followed by step S715, at which it is determined whether all documents in



or a file that has been converted to an image, whereby it becomes possible to display, in a simple manner, the stored document based upon the access key that has been received.

5 Further, only the storage location (text data) of a document can be transmitted as the main body of electronic mail to another person, and the stored document can be acquired and displayed in a simple manner based upon the storage location that has been  
10 received.

Furthermore, even if a person is not registered as a user with a database in which a document has been stored, it is possible to access the document through an access-key user that has been assigned to an access key.

15 The foregoing embodiment describes an operation performed in a thumbnail display area. However, if a similar operation is performed in a list display area, similar results will be displayed based upon the list display.

20 Further, it is possible to obtain a set-up in which only the same version of a document identical with a document designated by the transmitting party can be accessed [this is a case where the "APPLICABLE-DOCUMENT ALL-VERSION ACCESS ENABLE (508) FLAG" is OFF and,  
25 moreover, the "SAME-FOLDER ALL-DOCUMENT DISPLAY (503) FLAG" is ON].



Further, it is possible to obtain a set-up in which any version only of a document identical with a document designated by the transmitting party can be accessed [this is a case where the "APPLICABLE-DOCUMENT ALL-  
5 VERSION ACCESS ENABLE (508) FLAG" is ON and, moreover, the "SAME-FOLDER ALL-DOCUMENT DISPLAY (503) FLAG" is OFF].

Further, it is possible to obtain a set-up that allows access only to all documents of the same version,  
10 which exist when the transmitting party specifies a document, in a folder that same as that of the document when the transmitting party specifies the document. In other words, it is possible to construct an environment identical with that of the document being accessed by  
15 the transmitting party [this is a case where the "APPLICABLE-DOCUMENT ALL-VERSION ACCESS ENABLE (508) FLAG" is OFF and, moreover, the "SAME-FOLDER ALL-DOCUMENT DISPLAY (503) FLAG" is ON].

Further, it is possible to obtain a set-up in which  
20 all documents of all versions that exist in a folder the same as that of the document specified by the transmitting party is accessed [this is a case where the "APPLICABLE-DOCUMENT ALL-VERSION ACCESS ENABLE (508) FLAG" is ON and, moreover, the "SAME-FOLDER ALL-DOCUMENT  
25 DISPLAY (503) FLAG" is ON].

According to the embodiment, it is assumed that the

side storing the documents retains all versions.  
However, the present invention is applicable also in a  
case where, when update processing has been applied to  
documents, only the latest documents remain. This  
5 merely represents a state in which only the latest  
versions of documents are available.

It goes without saying that the object of the  
invention is attained by supplying a storage medium  
storing the program codes of the software for performing  
10 the functions of the foregoing embodiment to a system or  
an apparatus, reading the program codes with a computer  
(e.g., a CPU or MPU) of the system or apparatus from the  
storage medium, and then executing the program codes.

In this case, the program codes read from the  
15 storage medium implement the functions of the  
embodiment, and the storage medium storing the program  
codes constitutes the invention. By reading the program  
into the system or apparatus from the storage medium,  
the system or apparatus will operate in accordance with  
20 a predetermined method.

Further, the storage medium for supplying the  
program code can employ a floppy disk, hard disk,  
optical disk, magneto-optical disk, CD-ROM, CD-R,  
magnetic tape, non-volatile type memory card or ROM.

25 Furthermore, besides the case where the aforesaid  
functions according to the embodiments are implemented

by executing the program codes read by a computer, it goes without saying that the present invention covers a case where an operating system or the like running on the computer performs a part of or the entire process in accordance with the designation of program codes and implements the functions according to the embodiments.

It goes without saying that the present invention further covers a case where, after the program codes read from the storage medium are written in a function expansion board inserted into the computer or in a memory provided in a function expansion unit connected to the computer, a CPU or the like contained in the function expansion board or function expansion unit performs a part of or the entire process in accordance with the designation of program codes and implements the function of the above embodiment.

In a case where the present invention is applied to the storage medium, program code corresponding to the flowcharts described earlier in Figs. 7, 8A and 8B is stored on this storage medium.

Thus, in accordance with the present invention, as described above, it is possible to transmit access information such as the storage location and access privilege of a document without transmitting the actual document or a file in which the document has been converted to an image as the access-key file by using

the electronic mail, thereby making it possible to display the document easily on the receiving side without increasing the load upon the electronic mail system.

5 Further, in accordance with the present invention, it is possible to transmit the storage location of a document as the main body of electronic mail so that the document can be displayed easily on the receiving side.

10 Further, in accordance with the present invention, it is possible for a receiving party to gain temporary access to a document without requiring that the receiving party register as a user with the system in which the document has been stored.

15 Further, in accordance with the present invention, it is possible for the transmitting side to limit the version of documents accessed by a receiving party.

20 Further, in accordance with the present invention, it is possible for a receiving party to access a document within a folder the same as that containing a document specified by the transmitting party.

As many apparently widely different embodiments of the present invention can be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific  
25 embodiments thereof except as defined in the appended claims.